

# DISCOVERY OF A JUVENILE COELACANTH IN THE LOWER CRETACEOUS, CRATO FORMATION, NORTHEASTERN BRAZIL

by

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**ABSTRACT.** - An almost complete specimen of a juvenile coelacanth, measuring 70 mm total length, from the Aptian age Nova Olinda Member of the Crato Formation (Arairipe Basin, Brazil), is here recorded and referred to the genus *Axelrodichthys*. This is the first record of a Coelacanthidae in this Cretaceous geological formation. Although the presence of a juvenile *Axelrodichthys* does not elucidate the reproductive strategy in this taxon, its small size, when compared to the very large embryos of *Latimeria* (300 mm), suggests a disparity between these large coelacanth genera, whose adults grow up to over one metre.

**RÉSUMÉ.** - Découverte d'un Coelacanth juvénile dans la Formation Crato du Crétacé inférieur (nord-est du Brésil).

Un exemplaire presque complet d'un coelacanth juvénile, mesurant 70 mm de longueur totale, provenant du Membre Nova Olinda de la Formation Crato (Aptien du Bassin d'Arairipe, Brésil) est attribué au genre *Axelrodichthys*. C'est la première fois qu'un Coelacanthidae est signalé dans cette formation géologique. Même si la présence de ce juvénile d'*Axelrodichthys* n'élucide pas la stratégie reproductive chez ce taxon, ses petites dimensions, comparées à celles des embryons de *Latimeria* (300 mm), montrent une forte disparité entre ces deux genres dont les adultes dépassent un mètre de longueur.

**Key-words.** - Actinistia, Coelacanthidae, *Axelrodichthys*, Brazil, Crato Formation, Cretaceous, Juvenile.

Coelacanths, a group of actinistian sarcopterygian fishes known as fossils from the Devonian to the Late Cretaceous (Forey, 1998), were of interest to paleontologists long before 1938 when the discovery of *Latimeria chalumnae* Smith, a 'living fossil', in the western Indian Ocean attracted widespread attention (Smith, 1939, 1956). The recent discovery of coelacanths in Sulawesi, Indonesia, in the eastern Indian Ocean (Erdmann *et al.*, 1998; Erdmann, 1999; Pouyaud *et al.*, 1999) has brought the actinistians in the center of attention again.

Here we record a fossil newborn coelacanth from the Nova Olinda Member of the Crato Formation, Araiipe Basin, a fossil Konservat Lagerstätte famous for the exceptional preservation of diverse Early Cretaceous (Aptian) biota (Martill, 1993). The specimen (Fig. 1) is currently housed in the collection of the Universidade Regional do Cariri in Ceará State, Brazil, under the number MSPC-287. It is an almost complete, fully articulated, but flattened individual, exposed on its left side and measuring only 70 mm in total length.

Coelacanths are common in the Lower Cretaceous Brazilian Basins (Woodward, 1907, 1908; Wenz, 1975, 1980; Carvalho, 1982) as well as in many Western African Basins

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(Weiler, 1935; Casier, 1961; Tabaste, 1963; Wenz, 1975, 1981). Two taxa, *Mawsonia gigas* and *Axelrodichthys araripensis*, have been recorded from the slightly younger nodule-bearing Romualdo Member of the Santana Formation, in the Araripe Basin (Campos and Wenz, 1982; Maisey, 1986, 1991). Apart from being the first coelacanth to be reported from the Crato Formation, the new specimen is remarkable for its small size.

The small size and the very long supplementary caudal lobe (= epicaudal lobe) indicate it is a young individual. The taxonomic identification of the specimen was made by comparison with other Mesozoic coelacanth material.

Even though the studied specimen lacks the rostral part of the skull and the diagnostic cheek bones are not preserved, the presence of three pairs of dermal bones in the posterior skull roof, as well as the dermal bone ornamentation pattern, clearly show that it belongs to the *Mawsonia* - *Axelrodichthys* group. The shape of the angular bone, which is deepest near the anterior margin, and the suture with the principal coronoid, placed well behind this level, as well as some meristic data (e.g., first dorsal fin = 10 rays; second dorsal fin = 12 rays; caudal = 16 rays in the upper lobe, 14 rays in the lower lobe; pelvic fin = 12; anal fin = at least 11 rays) strongly suggest that the specimen belongs to the genus *Axelrodichthys*, a taxon known by its large size (over 1 metre total length).

The reproductive biology of coelacanths is still poorly known. *Latimeria chalumnae* is ovoviviparous, giving birth to live young individuals, about 300 mm long (Smith *et al.*, 1975). *Undina penicillata* from the Upper Jurassic Solnhofen limestone, in which one specimen was found with two small, incompletely ossified individuals inside its body (Watson, 1927), possibly had a similar reproductive strategy. Evidence of oviparous strategy was reported for the small Carboniferous coelacanth, *Rhabdoderma exiguum*, in which a large number of eggs, and young individuals ranging from pups with a large yolk sac to specimens lacking the yolk sac were found in Illinois (Schultze, 1972). Although the presence of free-living 70 mm *Axelrodichthys* sp. does not elucidate the reproductive strategy in this genus, its small size, when compared to the large embryos of *Latimeria*, shows a disparity between these large coelacanth genera.

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Fig. 1. - Juvenile *Axelrodichthys* sp., n° MSPC- 287 (70 mm TL), from the Nova Olinda Member of the Crato Formation.

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